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A GUIDE TO SELECTING &
BUYING LUMBER

Learn the tips and tricks for buying hardwood to ensure that you'll get the best lumber possible for all of your projects.

To build great-looking projects, you need good wood. When I was a beginning woodworker, I would purchase premium-priced boards from the lumberyard. But my projects would never look like the ones in the magazine, even though I'd built them carefully.

Eventually, I realized the difference was in the wood. That meant good-quality lumber alone wasn't enough. To get *great* results, I needed to find the absolute *best boards* for the specific project at hand.

Here, we'll help you understand how to evaluate boards based on their type, grain, color, and defects. Be prepared to spend some time sorting through stacks of lumber to do this.

And be aware that lumber is an inconsistent material. As a result, you'll need to buy about 25 percent extra to allow for defects, waste, and the occasional "oops."

Of course, buying extra lumber adds cost, and good wood can be expensive. But we have some great tips on page 4 that will help you save money when you buy boards.

SOFTWOODS & HARDWOODS —
KNOW THE DIFFERENCES

SOFTWOOD LUMBER

Softwood boards are usually milled to standard sizes (such as 2x4 or 1x6), so all boards of the same species and size are priced equally.

HARDWOOD LUMBER

Hardwood boards are milled in random widths and lengths, so boards of the same species often have different prices.

The first thing you need to understand about wood is that there are two distinct types: softwood and hardwood. Surprisingly, this distinction doesn't mean that all softwoods are soft and hardwoods hard.

For woodworkers, the most important difference between softwoods and hardwoods lies in how each type is milled and sold.

Most of the time, softwoods are cut into boards with standard sizes and sold as "dimensional" lumber *(Photo, left)*. Although this produces waste as the boards are trimmed to size, softwoods grow relatively quickly and yield an abundant supply of wood.

Hardwood trees take longer to reach harvestable size, so hard-wood logs are milled to produce the maximum number of boards with minimal waste. That explains why hardwoods are sold in random widths and lengths *(Photo, left)*.

As for thickness, softwoods are standardized and expressed in inches. Hardwoods are also milled to standard thicknesses, but are measured differently.

Hardwood measurements are expressed in quarters of an inch, or just "quarters." So, a 1"-thick board is said to be "four quarters," shown as "4/4." A $1^1/_2$" board is "6/4" and so on. This measurement refers to the rough-milled thickness. When planed smooth, as most boards are, the board is $^1/_8$" to $^3/_{16}$" thinner.

APPEARANCE DEPENDS ON
HOW YOU SLICE IT

FLATSAWN

When a log gets milled into boards, the blade cuts through the growth rings *(Art, below right)*. The angle at which these rings are cut determines the appearance of the grain on the face of the board *(Photos, right)*.

The top board was "flatsawn" one slice after another. Look closely at this board's end grain, and you'll see that the growth rings run almost parallel to the face of the board. On the face, you see the telltale wavy grain that results.

The middle board was "quartersawn," meaning the log first gets cut into quarters and then sliced so that the end grain runs perpendicular to the board's face. This results in straight face grain. In some woods, such as oak, quarter-sawing produces "ray fleck" figure.

Quartersawn wood is almost always sold separately from flat-

sawn and priced higher. But some flatsawn boards will have quartered grain, depending on where in the log the board came from.

The bottom board is "riftsawn," Here, the end grain runs not parallel or perpendicular to the face, but between. The face grain is still straight but lacks the flecks. Riftsawn stock may be sold separately or, more typically, mixed in with flatsawn.

QUARTERSAWN

RIFTSAWN
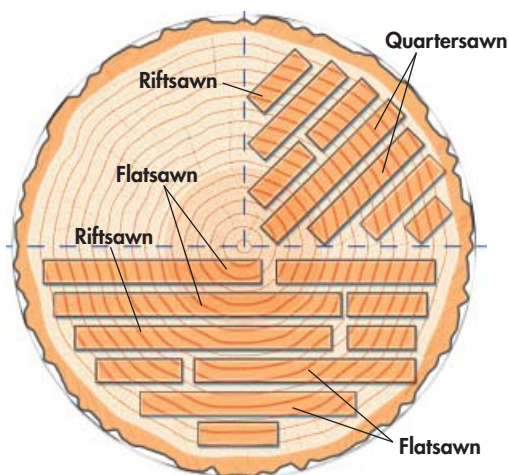
Quartersawn

Riftsawn

Flatsawn

Riftsawn

Flatsawn

HOW TO MEASURE HARDWOODS

When you purchase dimensional lumber, every board is the same size and, accordingly, priced the same. But hardwoods can't be priced "by the board" because they're sawn to random widths and lengths. That's why hardwoods have their own measurement system, called a *board foot* (bf).

One board foot is equal to a board 1" thick, 12" wide, and 12" long. But boards of different dimensions can also measure one board foot, as the *Illustrations* at right show.

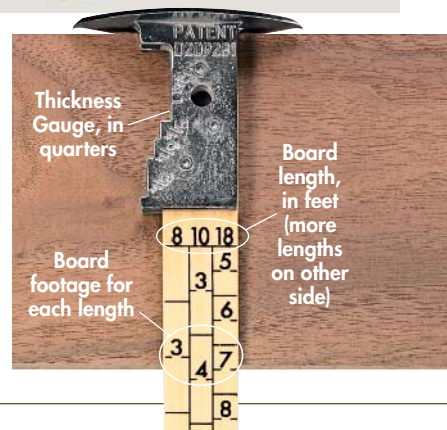$$\text{Board Footage} = \frac{T \times W \times L}{144}$$

Since hardwoods are priced per board foot, you need to understand board footage.

To calculate the board footage of any board, multiply its thickness, width, and length (all in inches), and then divide by 144. For example, a board 1" thick, 6" wide, and 96" long measures 4 bf ($1 \times 6 \times 96 = 576 \div 144 = 4$). If that board were 2" thick, it would be 8 bf ($2 \times 6 \times 96 = 1152 \div 144 = 8$).

To save you from having to measure every board, lumber dealers will have a grading stick, shown at right. It's like a "cheat sheet" for measuring board feet. Just lay it across the board, and it shows you the board footage.

2" x 6" x 12" = 1 board foot

1" x 12" x 12" = 1 board foot

1" x 6" x 24" = 1 board foot
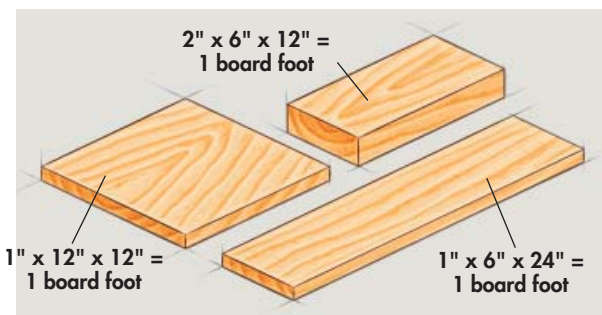
▶ A grading stick shows the board footage of 4/4 stock. Read the number that's closest to the edge under the "length" number. If the board is 8-feet long, it measures 3 bf. Multiply by the thickness if the board is thicker.

Thickness Gauge, in quarters

Board length, in feet (more lengths on other side)

Board footage for each length

WATCH YOUR FIGURE

When selecting boards, grain figure is the first thing you should examine. That's because it will have the single biggest influence on the appearance of the project.

Because of this, make sure to have a good idea of what kind of figure you want before you shop. There's no right or wrong when it comes to figure. Whether you prefer the wood to be subtle or highly figured is up to you. Just remember that with subtle figure, you are more likely to notice the project itself. With highly figured wood, you'll likely notice the wood more than the project.

Once you know what you want, start by pulling out and setting aside those boards that have the right type of figure. When I shop, I'll often start by pulling twice as many boards as I really need. Boards that don't have the right kind of figure get neatly restacked on the pile.

Once you have a batch of good boards, line them up side by side. Keep the best grain matches, and return the rejects to the stack.

At the same time, you need to think about what project parts may be cut from each board. You'll want the most-visible parts of the project to come from the best boards.

This grain-matching process will probably cull some boards from your batch of contenders. Ideally, you'll still have about 50 percent more wood at this point in the process than your project calls for. If so, you're ready to move on.
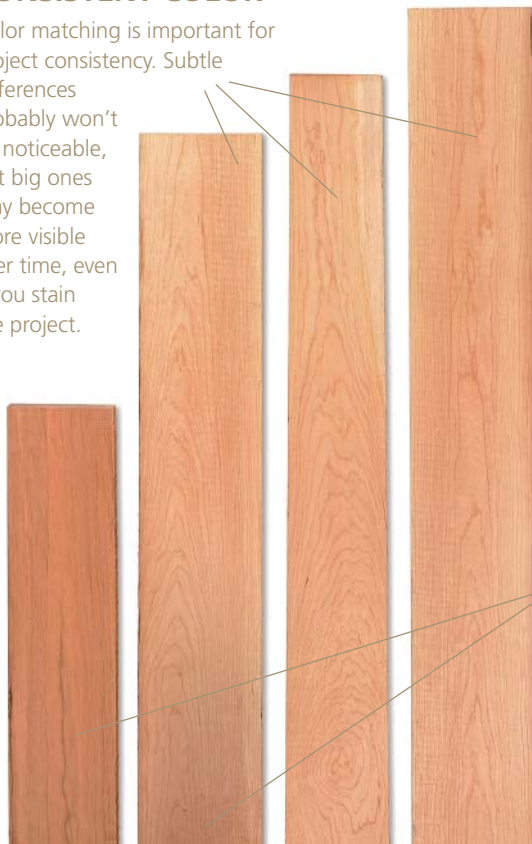
GOOD MATCHES

All three of these boards have straight grain with similar spacing between the lines. When used in a project, they'll match create a consistent look throughout.

POOR MATCH & VARIATION

These two boards match poorly with each other and the three above. They should be rejected or used in unseen parts of the projects.

KEEP AN EYE ON COLOR

Now you can start to match color. Again, your goal is consistency.

Don't be too quick to decide one board is "just the color you want." I've been frustrated before by doing this and then being unable to find more boards that match. You'll have better luck if you look instead for the color that most of your contenders have in common. You can always tweak the color with a stain or finish to get the exact color you desire.

Even in the best batch of boards, you're bound to find some color inconsistency. That's because trees absorb different minerals depending on where they grow. And chances are slim that you'll find a batch of boards together in the stack that were cut from a single tree.

So, just as you did when matching grain, keep your project parts in mind so that you can reserve the best color for the most visible parts. Again, restack the rejects as you sort through your contenders.

When matching color, just like when matching grain, you're likely to have to make some compromises. But if you've selected carefully, you should have options. If the color and/or grain figure are mismatched on some boards, use those for internal parts, or at least those parts that are the least visible.

After color matching, you want to be left with about 25 percent more wood than you need to complete your project.

CONSISTENT COLOR

Color matching is important for project consistency. Subtle differences probably won't be noticeable, but big ones may become more visible over time, even if you stain the project.

COLOR CHANGE

All woods can vary in color. But some, such as this cherry, are particularly prone to variation. Reject boards that differ widely whenever possible. But if you just can't find enough matching boards, use the off-color ones for parts that won't be seen.

Knot

Checks

Cup

Bow

Crook

Twist
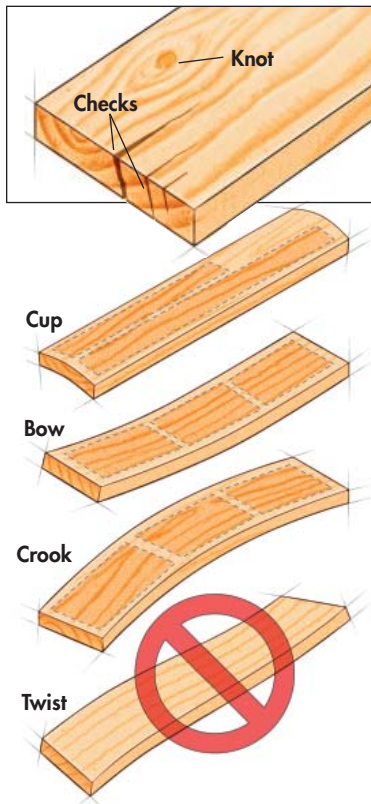
DON'T GET DONE IN BY DEFECTS

Now check for defects. Hardwood is graded on how few knots and checks (splits) it has *(Illustration, left)*.

The highest-grade boards, called "Firsts and Seconds" (FAS), have to be at least 8-ft. long, 6" wide, and yield at least 80 percent clear cuttings on the best face. "Selects," the second-highest grade, can be shorter. "No. 1 Common" boards follow, and are 66-percent clear on the best face.

Work Around Defects— Splits at the end of a board aren't a big deal. Just crosscut these sections off, or rip around them. You also can cut around knots. If the knots are small and tightly attached, use those sections to make parts that aren't seen.

Check For Flatness — Grades tell you about defects, but give no indication of lumber

flatness. The *Illustrations* at left show warped boards, and some possible ways to salvage them:

Cup — A board that is U-shaped from edge to edge is cupped. Often, these boards can be ripped into narrower, flat boards.

Bow — If a board is bowed (U-shaped from end to end), crosscut it into shorter pieces.

Crook — Another defect is crook, or a "dogleg" shape. You may be able to crosscut these boards into short sections.

Twist — A twisted board has a mild "cork-screw" shape. If the twist is severe, don't use the board. It may be unstable and continue to twist, even if cut into smaller pieces.

▲ Look down the edge of each board to check for bow and twist. Then look at the face for crook or cup. If any of these are present, you may want to reject the board.

SIMPLE STRATEGIES FOR
SAVING MONEY ON WOOD

Good lumber doesn't come cheap. But here are a few ways to make your lumber dollar go further:

Go Short — Dealers sometimes have to cut long boards down. Remnants of these boards measuring four to five feet long will get sold as "shorts" at a lower price.

Go Big — Handling costs drive up lumber prices, so dealers like to sell in volume. Most offer discounts if you buy a minimum number of board feet. Discounts can start at 25 board feet and are common at 100 and 250 board feet. Many times, you can mix species and still get a break.

Downgrade — If your dealer carries No. 1 Common, consider buying that instead of FAS or Select. Common boards yield

less wood, but often sell for 30 percent less. You'll have more waste, but if your project doesn't require a lot of large parts, you can still be money ahead.

Create Quartersawn — If you look again at the *Illustration* on page 2, you can see that many flatsawn boards will contain sections along one or both edges that have straight grain figure. So rather than pay a premium for quartersawn or rift-sawn stock, you can select wide flatsawn boards and rip off these straight sections. Use the remnants for unseen parts where the grain figure doesn't matter.

Use Low-Cost Wood — In many projects, there are a number of parts that will be seldom or never seen. You can build these from a less expensive hardwood

to save money. Drawers are a great example.

As you can see in the *Photo* below, the drawer sides, front, and back are made from poplar. It costs about half as much as the higher-priced cherry and performs just as well.

▼ Poplar works great for internal parts, such as drawer sides. The wood is stable, easy to work with, and inexpensive.

Cherry Drawer Front

Poplar Drawer Box

HOW TO TURN RAW LUMBER INTO
PERFECT PROJECT PARTS

Learn how to find the best-looking wood in every board as you break rough lumber down into project parts.

▲ **Follow the Lines.** The wildly figured grain on the door at *left* is very distracting. Using straight-grained stock for the parts, *right*, gives the door a more professional look.

Bringing home lumber for a new project is always exciting. With plans in hand, you're ready to start slicing those raw boards into parts that you'll machine and assemble into something beautiful. But don't let this excitement get the better of you. Instead of just randomly cutting parts from the boards, you can use a few simple methods to help you pick the best piece for every project part.

If you simply cut the parts from wherever they happen to fit on a board, you may end up with mismatched grain patterns on parts of your project. To improve the appearance of your projects, you need to carefully select what area of the board each part should be cut from. This extra effort makes a dramatic difference in how the finished product will look *(Photos, left)*.

Here, we'll show you how it's done. You only need a few "tools," below, and a good eye to get the best from every board.

WHAT YOU'LL NEED:

● **Materials List.** Whether from a set of plans or homemade, this list should detail the quantity and dimensions of each project part.

● **Tape Measure.** When laying out your parts, you only need approximate, oversize dimensions. But a tape measure is still indispensible.

● **Chalk.** Unlike pencil marks, chalk is highly visible on rough stock and wipes off easily. You can even color-code different assemblies.

● **Sight Gauge.** This shop-built tool *(Illustration, page 6)* makes it easy to select the best grain by highlighting only what you want to see.
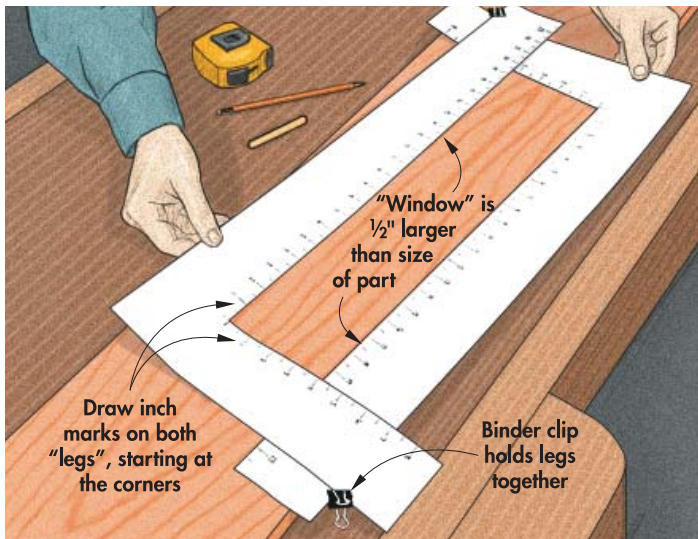
◄**Seek Great Grain.** A sight gauge makes it easy to see what grain figure will look like on a part by blocking out the surrounding area. Move the gauge until you see the best-looking grain figure in the opening.

►**Then Chalk It Up.** Use chalk to outline defects and parts. If you need to change a part location, you can just wipe off the marks with a rag and start again.

"Window" is ½" larger than size of part

Draw inch marks on both "legs", starting at the corners

Binder clip holds legs together

Mark knots, splits, and other defects, so you can avoid them easily

Work around checks at ends to minimize waste

Lay out pieces at an angle if that follows the best grain

Cut narrow parts from straight-grain areas of board

STEP-BY-STEP **BOARD BREAKDOWN**

The first step in creating perfect project parts is to select the best boards. On pages 1-4 we showed you how to choose boards based on grain figure, color, and defects. Now you need to take this strategy a step further by selecting where each part will come from on the board to give the project the best overall appearance.

The *Illustration* above shows how I use a shop-built "sight gauge" to lay out many parts. The gauge is just two L-shaped pieces of posterboard clipped together. I adjust the opening to be about ¹/₂" wider and longer than the part, and then lay the gauge on the board.

Get the Big Picture — When you start laying out parts, you may be inclined to just grab a board, mark out parts until it's "full," and then move on to the next. This leads to mismatched grain and wasted wood. Instead, place all the boards for that project side by side, so you can choose the best part location from any board.

Highlight the Good, Bad, and Ugly — With the boards laid out, examine all of them and mark defects or other areas to avoid, as well as any interesting grain features you may want to highlight *(Photo, far right)*.

Start with the Obvious — Now you can start to lay out the parts. But don't just do this in order of the materials list. These lists generally follow the construction sequence, so you could end up using the best stock to make the least visible parts. And cutting diagrams can't account for grain figure and defects in the boards.

A better idea is to select the highly visible parts, such as tabletops, rails and stiles, door panels, and drawer fronts, first. Then work your way to the least visible parts. Hidden parts can have the least desirable grain.

Seek Similarities — When making more than one of any part, cut them from areas with similar grain. If you don't, the differences really stand out. Take all of these parts from the same board if possible. You can cut them from different boards, though, *if* that provides the best match.

Review, Cut, and Categorize — Once all of your parts are marked, review the materials list and boards to make sure you have all parts accounted for. Then cut out the parts, and stack them in a logical order.

Look From a New Angle — Keep in mind that the best grain sometimes runs across the board at an angle instead of parallel to the board edges. Just cut these parts following the grain as shown in the *Photo* below.

▲**A New Angle.** You can use a jig saw or band saw to rough-cut parts that run across the board. Then true one edge and cut the part to final size.

workshop
Wood Storage

Ideas for keeping your lumber neat and organized.

Dealing with wood storage is always a challenge, especially in a small shop. This is partly due to the fact that your inventory of lumber is always changing. At the onset of a project, you may have a large stack of boards waiting to be cut up. Once the project is over, you're left with a pile of short cutoffs to store.

Unfortunately, this means that it's nearly impossible to come up with a "one-size-fits-all" solution to wood storage. The best approach is to break down the problem of lumber storage into three distinct areas — sheet goods, long boards, and cutoffs.

Sheet Goods

When you're short on space, the easiest way to store sheet goods is to lean them against a wall of the shop. The only problem with this is that the sheets tend to topple like dominoes when you try to sort through them.
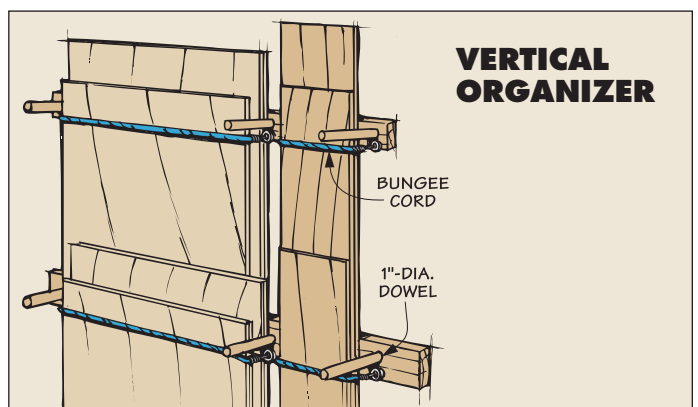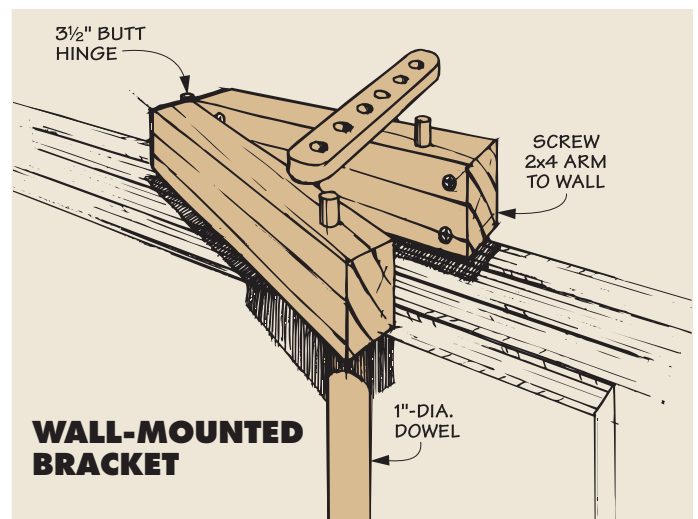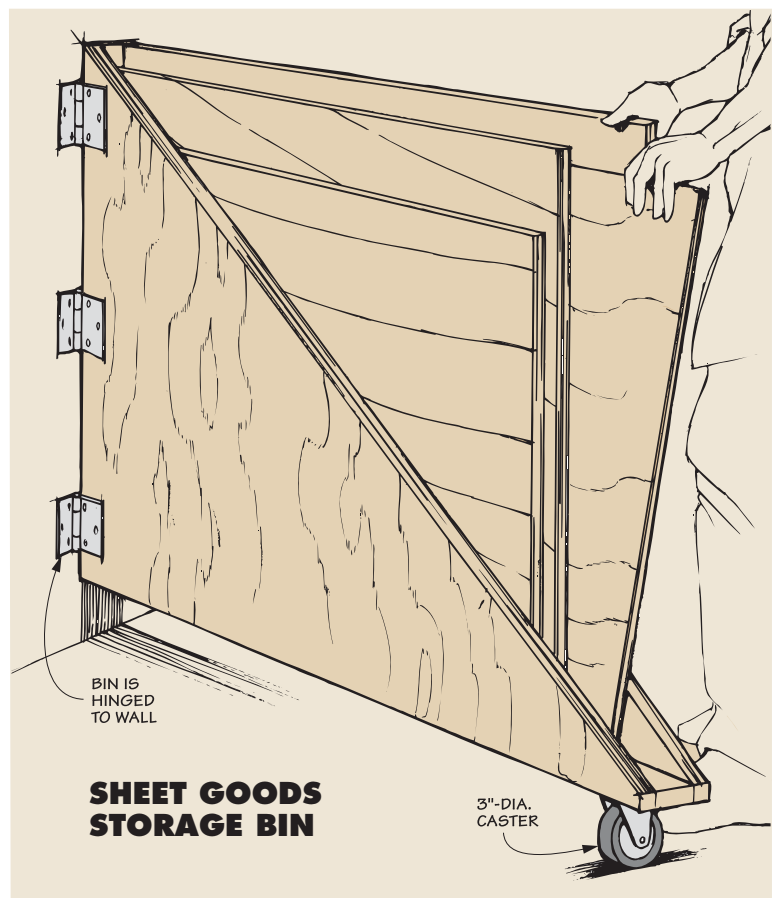
One solution is to build a sheet goods storage bin like the one shown above. The bin is hinged to the wall and is supported by a caster on the other end so you can swing it out away from the wall. This allows you to sort through sheets of plywood like files in a filing cabinet.

If you don't have the space for a swing-out bin, how about a simple wall-mounted bracket like the one shown at right. It's nothing more than a pair of arms that are hinged at one end. A strip of wood with holes in it slips over a couple of dowels mounted at the ends of the arms, locking them in position. A larger dowel glued in the bottom edge of the front arm prevents the sheet goods from falling over.

Long Boards

Just as in storing plywood, you can save space by storing boards on end against a wall, provided you have enough headroom in your shop. They'll take up less space and it's easier to sort through them to pull out the boards you need.

You can make a simple vertical organizer for boards and sheet goods by drilling holes in a few narrow strips of wood for some large-diameter dowels. Then just screw the boards to the wall horizontally. Bungee cords are used to hold the boards in place so they don't fall forward.

SHEET GOODS STORAGE BIN

BIN IS HINGED TO WALL

3"-DIA. CASTER

3½" BUTT HINGE

SCREW 2x4 ARM TO WALL

WALL-MOUNTED BRACKET

1"-DIA. DOWEL

VERTICAL ORGANIZER
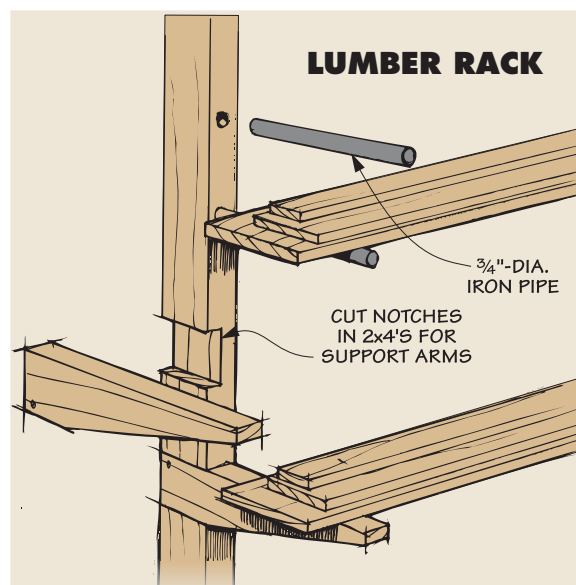
BUNGEE CORD

1"-DIA. DOWEL

LUMBER RACK. Of course, if you are in a basement shop, you will probably have to store your boards flat on a lumber rack. If your shop has open-stud walls, building a rack can be as simple as drilling holes in the edges of the studs for some short lengths of iron pipe. Drill the holes at a slight angle (about 5°) to prevent the pipes from accidentally working out of the holes.

For a shop with finished walls, you can still build a wall-mounted lumber rack. Just add some 2x4 studs to the front of the wall by suspending them from the overhead floor joists or attaching them to the wall with lag screws. If you're going this route, you may want to notch out the studs first for some wood support arms instead of using iron pipe. Either way, it's better to position the pipes or support arms so that you have several narrow "levels" of storage rather than a few tall ones.

OVERHEAD RACK. If wall space is in short supply in your shop, an overhead lumber rack may be just what you're looking for. The one shown in the drawing at left is constructed out of 2x4 stock. The hangers, which look like inverted telephone poles, are suspended from the floor or ceiling joists overhead.

LUMBER RACK

¾"-DIA. IRON PIPE

CUT NOTCHES IN 2x4'S FOR SUPPORT ARMS

OVERHEAD RACK

ATTACH HANGERS TO OVERHEAD JOISTS
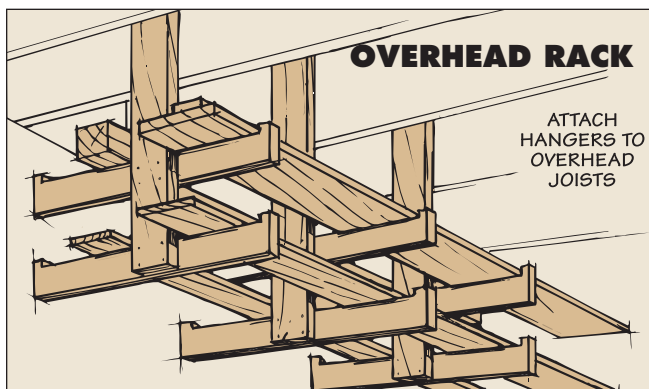
Cutoffs

When it comes to storing cutoffs and short pieces of wood, the trick is to keep them organized so that you can easily sort through them. Otherwise, they quickly get buried underneath each other. Aside from this, storing cutoffs is just a matter of finding some unused space in your shop that will work.

One area that comes to mind is the open space underneath the basement stairs. By building some simple shelves like you see in the drawing below, you can store your cutoffs according to length — longer pieces on the lower shelves and shorter ones up top.

Another option is to store cutoffs overhead, as in the drawing at right. You can create storage compartments by nailing narrow cleats across the bottom of the floor joists. Then just sort the cutoffs by length or wood type. One last tip. I find it helpful to write the length and species of wood on the end of each board. This way, you can find what you're looking for at a glance instead of sorting through the whole stack. **W**

PLYWOOD SHELF

SCREW SHELF SUPPORTS TO POSTS AND STAIR STRINGERS

UNDER STAIRS

OVERHEAD

ATTACH 1x3 CLEATS TO FLOOR JOISTS